

REMARKS

Status of the Claims

Claims 1-12 are pending.

In the present Amendment, Claim 1 has been amended to recite that the separators have a thickness of from 10 to 30 μm . Support for the amendment is found, for example, in the paragraph bridging pages 15-16 of the originally filed specification.

No new matter has been added, and entry of the Amendment is requested.

Status of the Specification

On page 2 of the Office Action, the disclosure is objected to because on page 17, lines 10-12, “C” seems to represent current passing distance, and according to the Examiner, this needs to be addressed.

As set forth above, the specification has been amended to specify that the current passing distance is “C”. Applicants believe this addresses the Examiner’s concerns.

In addition, the paragraph bridging pages 22 to 23 of the specification has been amended to correct a typographical error. Both the error and the correction would have been obvious to one of ordinary skill in the art in light of the disclosure of the specification.

Response to the Examiner’s Rejection under 35 U.S.C. § 103

In Paragraph No. 1, on page 2 of the Office Action, Claims 1-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanjou et al. (U.S. Pub. No. 2003/0125702) (hereinafter “Tanjou”) in view of Takeuchi et al. (U.S. Patent No. 6,083,645) (hereinafter “Takeuchi ‘645’”), Takeuchi et al. (JP 2003-208895) (hereinafter “Takeuchi ‘895’”) and Shimamura et al. (U.S. Pub. No. 2003/0113621) (hereinafter “Shimamura”).

Applicants traverse and request the Examiner to reconsider and withdraw the rejection in view of the following remarks and the amendments to the claims.

The presently claimed lithium ion secondary battery comprising a battery element obtained by alternately stacking a plurality of positive electrodes and a plurality of negative electrodes through separators is not disclosed or fairly suggested by Tanjou, Takeuchi '645, Takeuchi '895 and Shimamura.

With regard to the thickness of the separator, it is known that resistivity of ion conduction between positive and negative electrodes will rise if the thickness becomes thicker. However, the present application teaches that the thickness should be not more than 50 μm , preferably not more than 30 μm to attain the low resistivity that is needed for a high power laminate-type lithium ion secondary battery that could used in a vehicle. *See, e.g.*, the paragraph bridging pages 15 to 16 of the specification. On the other hand, if the thickness becomes too thin, a short circuit will occur. In particular, a high power battery cell like that of the presently claimed invention has an increased number of separators. As described in the specification, the lower limit of separator thickness is not less than 5 μm , preferably not less than 10 μm .

Takeuchi '895 disclose a separator having 25 μm of thickness. As discussed in the previous action, Takeuchi '895 relates to a cylindrical shaped battery. In Comparative Example 2 of the present application, a cylindrical shaped battery was obtained, prepared from the combination of the same positive and negative electrodes and separator as the Working Example, but could not provide high-power battery having 3000W/kg or more of density. In particular, the cylindrical shape battery of Comparative Example 2 is quite inferior in power density. *See* Table 1 at page 28 of the specification. Applicants submit that this difference would have been

unexpected to one of ordinary skill in the art at the time of the invention, at least in view of the disclosure of Takeuchi '895.

According to the presently claimed invention, various parameters, such as battery shape, using liquid electrolyte, particle sizes of positive and negative active materials, thicknesses of positive and negative electrode, thickness of separators and terminal width, are tightly controlled to obtain a high-power battery cell that can be used in a hybrid or electrical vehicle. Therefore, the teachings of Takeuchi '895 and Takeuchi '645, which relate to cylindrical shape battery, cannot be combined with Tanjou. In light of the above, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness.

Even if Takeuchi '895 and Takeuchi '645 were combined with Tanjou, one of ordinary skill in the art at the time of the invention would not have predicted a high-power battery having power density of 3000 W/kg or more could be obtained by the presently claimed invention. These unexpectedly superior results would rebut any *prima facie* case the Examiner could have established.

In view of the above, Applicants request reconsideration and withdrawal of the rejection of the present claims under 35 U.S.C. § 103 based on Tanjou, Takeuchi '895, Takeuchi '645 and Shimamura.

Conclusion

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the local, Washington, D.C., telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.114(c)
U.S. Application No. 10/565,823 (Q92714)

The U.S. Patent and Trademark Office is hereby directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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